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PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION
(PCT Rule 61.2)

Date of mailing (day/month/year) 30 November 2000 (30.11.00)	To: Commissioner US Department of Commerce United States Patent and Trademark Office, PCT 2011 South Clark Place Room CP2/5C24 Arlington, VA 22202 ETATS-UNIS D'AMERIQUE in its capacity as elected Office
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International application No. PCT/CA00/00350	Applicant's or agent's file reference 0094-0003
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International filing date (day/month/year) 30 March 2000 (30.03.00)	Priority date (day/month/year) 30 March 1999 (30.03.99)
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Applicant

BARRY, C., Marvin

1. The designated Office is hereby notified of its election made:

in the demand filed with the International Preliminary Examining Authority on:

27 October 2000 (27.10.00)

in a notice effecting later election filed with the International Bureau on:

2. The election was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer
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Nestor Santesso

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 0094-0003	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/CA 00/00350	International filing date (day/month/year) 30/03/2000	(Earliest) Priority Date (day/month/year) 30/03/1999
Applicant OCEAN CONSTRUCTION SUPPLIES LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of **4** sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
 - contained in the international application in written form.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority in written form.
 - furnished subsequently to this Authority in computer readable form.
 - the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
 - the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. **Certain claims were found unsearchable (See Box I).**

3. **Unity of Invention is lacking (see Box II).**

4. With regard to the **title**,

- the text is approved as submitted by the applicant.
- the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- the text is approved as submitted by the applicant.
- the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

- as suggested by the applicant.
- because the applicant failed to suggest a figure.
- because this figure better characterizes the invention.

1

None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CA 00/00350

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

An apparatus and method for containing and filtering rinse water, sediment and aggregate resulting from washing the hopper and discharge chute components of a concrete truck at a construction site following use comprises a container (20) removably mountable on the end of the discharge chute (18), the container (20) having an open upper end (31), a screen (23) removably positionable within the container (20) and an outlet (29) located in a lower portion of the container (20) below the screen (23). The apparatus further includes a pump (32) mountable on the truck, the pump (32) having a suction hose (34) extending between the container outlet (29) and the pump (32), and a discharge hose (36) extending from the pump (32) to an open end discharging into the mixing drum (14). When the pump (32) is operating, rinse water and relatively small particle size sediment flushed down the chute (18) and into the container (20) is automatically conveyed through the suction (34) and discharge (36) hoses into the mixing drum (14).

INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA 00/00350

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B03B9/06 B08B9/00 B28C5/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B03B B08B B28C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 685 978 A (PETRICK ET AL) 11 November 1997 (1997-11-11) column 2, line 28 - line 45 column 4, line 28 - line 36 column 6, line 13 - line 14 column 9, line 42 - line 60; figures 1-3	11
A	---	1,2,9,10
Y	EP 0 034 539 A (COMPAGNIE DES SABLIÈRES DE LA SEINE) 26 August 1981 (1981-08-26) page 9, line 8 - line 26; figure 1	11
A	---	1,9,10
	-/-	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

28 June 2000

07/07/2000

Name and mailing address of the ISA

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Authorized officer

Van der Zee, W

INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA 00/00350

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 013, no. 237 (M-833), 5 June 1989 (1989-06-05) & JP 001 049604 A (MOTOMISE NAMAKON KK), 27 February 1989 (1989-02-27) abstract ---	1,8-11
A	US 5 605 398 A (CRONQUIST) 25 February 1997 (1997-02-25) column 2, line 41 - line 65; figures ---	1,9-11
A	GB 2 147 012 A (SAFETY-KLEEN PARTS WASHER SERVICE LTD) 1 May 1985 (1985-05-01) page 2, line 19 - line 35 page 2, line 62 - line 69; figures ---	1,10,11
A	US 5 741 065 A (BELL ET AL) 21 April 1998 (1998-04-21) abstract column 3, line 51 - line 58 column 4, line 51 - column 5, line 16; figures 1-5 -----	1,9-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/CA 00/00350

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
US 5685978	A 11-11-1997	NONE			
EP 0034539	A 26-08-1981	FR 2475943 A			21-08-1981
		BE 887500 A			12-08-1981
		DE 3105075 A			17-12-1981
JP 001049604	A 27-02-1989	NONE			
US 5605398	A 25-02-1997	NONE			
GB 2147012	A 01-05-1985	AU 565596 B			24-09-1987
		AU 3027084 A			10-01-1985
		CA 1250208 A			21-02-1989
		DE 3425033 A			17-01-1985
		FR 2548607 A			11-01-1985
		JP 60038077 A			27-02-1985
		NZ 208718 A			10-09-1986
US 5741065	A 21-04-1998	CA 2205855 A			23-11-1997

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference O094-0003	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/CA00/00350	International filing date (day/month/year) 30/03/2000	Priority date (day/month/year) 30/03/1999
International Patent Classification (IPC) or national classification and IPC B03B9/06		
<p>Applicant OCEAN CONSTRUCTION SUPPLIES LIMITED et al.</p> <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 10 sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 		

Date of submission of the demand 27/10/2000	Date of completion of this report 29.06.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Koob, M Telephone No. +49 89 2399 2080



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/CA00/00350

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1,3,5,6	as originally filed	
2,2a,4,7-9	with telefax of	09/03/2001

Claims, No.:

1-12	with telefax of	09/03/2001
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Drawings, sheets:

1/5-5/5	as received on	13/06/2000	with letter of	15/05/2000
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/CA00/00350

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:
5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).
(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)
6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-12
	No: Claims
Inventive step (IS)	Yes: Claims 1-12
	No: Claims

2. Citations and explanations
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/CA00/00350

V. Reasoned statement

1. The subject-matter of **claim 1** meets the requirements of Article 33 PCT in respect of novelty and inventive step.
 - 1.1 The document **US-A-5 685 978** discloses a wash-off containment and recirculating apparatus comprising:
 - a container (38) comprising
 - an open upper end (40)
 - a screen (54)
 - an outlet (70)
 - 1.2 The subject-matter of **claim 1** differs from **US-A-5 685 978** in
 - the container being removably mounted on the end of a discharge chute
 - a pump mountable on a truck
 - a first and second hose portion
 - 1.3 The technical problem to be solved is to provide a wash-off containment and recirculating apparatus for rinsing a vehicle such as a concrete truck after use wherever the vehicle may be located without contaminating the surrounding site.
 - 1.4 Non of the documents cited in the international search report disclose in combination the differentiating features of the claim. Therefore the man skilled in the art is not lead to the subject-matter of **claim 1**.
2. **Claims 2-10** are preferred embodiments of **claim 1** and meet as such the requirements of the PCT with respect to novelty and inventive step.
3. The subject-matter of **claim 11** complies with the provisions of Article 33 PCT in respect of novelty and inventive step.
 - 3.1 The document **US-A-5 685 978** discloses the following method of rinsing a vehicle:
 - providing a container
 - said container having a screen (54) removably positionable within the

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/CA00/00350

container

- said container having an outlet (68) located in a lower portion of said container below said screen
- removably positioning the container at a lower end of a discharge chute (column 9, lines 45-47)
- rinsing said discharge chute and discharge hopper with rinse water to wash sediment and aggregate present therein into said container (column 9, lines 48-51)

- 3.2 The subject-matter of **claim 11** differs from **US-A-5 685 978** in the method step of:
- providing a container being mountable on said vehicle
 - pumping said rinse water and sediment passing through said screen from said outlet of said container into a mixing drum
- 3.3 The technical problem to be solved is to rinse a vehicle such as a concrete truck after use wherever the vehicle may be located without contaminating the surrounding site.
- 3.4 The document **FR-A-0 034 539** discloses a method of rinsing a vehicle using non-removable equipment. The rinse water is reused for rinsing (page 9, lines 23-25) the mixing drum (figure 1). As disclosed in figure 1 the rinse water is pumped (figure 1; pump (without reference sign) in duct between "eau claire" and mixing drum) back for recycling. As the document discloses a permanent installation it does not teach the use of a container being mountable on a vehicle.

The document **US-A-5 741 065** discloses a method of rinsing a vehicle with the use of a container being mountable on the vehicle. The whole content of the container is poured into the mixing drum using a lifting mechanism. Therefore this document does not teach the use of a pump. Furthermore not only the sediment passing through a screen is conveyed in the drum but the whole sediment.

4. **Claim 12** is a preferred embodiment of **claim 11** and meets as such the requirements of the PCT with respect to novelty and inventive step.

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Moreover, concrete truck wash-off can pose serious environmental concerns. In many cases precautions must be taken at the construction site to ensure that sediment and cementitious debris does not contaminate the site or adjoining waterways. Enforcement of environmental regulations at construction sites is becoming increasingly stringent and hence it is anticipated that this issue will become more prominent in the future.

United States Patent No. 5,685,978, Petrick et al., dated 11
10 November, 1997 exemplifies the prior art. Petrick et al. discloses a concrete reclaimer which is positioned at a designated location at a construction site. In use, once a concrete truck finishes placing a load of concrete, it backs up to the location of the reclaimer to a position where the end of its delivery chute is disposed above the reclaimer. The chute and other delivery equipment is then washed with a stream of water ordinarily supplied from the truck. The reclaimer includes a separating screen for separating aggregate from sand and uncured cement. After the washing operations, the reclaimer may be transported to a recycling facility where the aggregate, sand, cement and water is removed and reused in the manufacture of fresh concrete. The Petrick et al. reclaimer is portable but only with the use of heavy equipment, such as a fork lift. For example, in order to transport the reclaimer to the recycling facility, the reclaimer must be lifted on to a flatbed truck or the like.

25 Some concrete supply companies have developed truck-mounted wash-off containment systems. However, existing systems are

- 2a -

unreliable and are not user-friendly. According to one existing system developed by Lafarge Canada Inc., a funnel is removably mounted at the end of the truck discharge chute before the hopper and chute are rinsed. The funnel directs rinse water and sediment adhering to the hopper and

5 chute into a 5 gallon (approximately 20 litre) bucket which is positioned on the ground. The operator is then required to lift the bucket and carry it to a 15 gallon (approximately 60 litre) pressurized tank which is mounted on a truck frame immediately behind the truck cab. The contents of the bucket are then carefully dumped into the tank inlet through a metal screen

10 which filters out larger size aggregate granules. After the tank is pressurized, a discharge valve is opened and the sediment and rinse water is blown through a discharge hose into the truck mixing drum.

The Lafarge system suffers from several shortcomings. The

15 need to manually lift the 5 gallon (approximately 20 litre) containment bucket from ground level, carry the bucket to the pressurized tank, and carefully discharge the bucket

- 3 -

contents into the pressurized tank inlet mounted at waist level requires considerable manual labour and increases the risk of lower back injuries, especially in older workers.

- 5 The valves of the pressurized tank also have a tendency to become clogged with slurry. This increases maintenance costs and results in reduced operator compliance. Further, depending upon the location where the pressurized tank is mounted, it may not be possible to generate a sufficient degree of air pressure in the tank to fully discharge the entire
10 tank contents into the truck mixing drum which exacerbates the clogging problem.

- 15 The need has therefore arisen for an improved system for containing concrete truck wash-off and automatically recirculating it back into the mixing drum of the truck.

Summary of Invention

- In accordance with the invention, a wash-off containment and
20 recirculating apparatus is described for use in association with a concrete truck having a mixing drum and a discharge chute. The apparatus comprises a container removably mountable on the end of the discharge chute, the container having an open upper end, a screen removably positionable within the container and an outlet located in a lower portion
25 of the container below the screen. The apparatus further includes a pump mountable on the truck, the pump having a suction hose extending

- 4 -

- between the container outlet and the pump; and a discharge hose extending from the pump to an open end discharging into the mixing drum. When the pump is operating, rinse water and relatively small particle size sediment flowing down the chute and into the container is automatically
- 5 conveyed through the suction and discharge hoses into the mixing drum. Preferably, the screen has openings approximately $\frac{1}{4}$ inches (approximately 6.35 mm) in diameter to trap relatively large particle size aggregate, thereby preventing clogging of the pump fittings.
- 10 The screen may further include a handle on its upper surface for lifting the screen and any of the relatively large particle size aggregate which has accumulated thereon from the container. Optionally, a filter may be mounted in the container outlet as an additional safeguard.
- 15 Preferably the pump comprises an air-operated diaphragm pump connectable to the pressurized air supply of the truck. In order to minimize the length of the discharge hose, the pump is preferably mounted in a rear portion of the truck proximate the mixing drum. A frame may also be provided on the truck for securely storing the container when it is
- 20 not in use.

- 5 -

Brief Description of Drawings

In drawing which illustrate the preferred embodiment of the
5 invention, but which should not be construed as restricting the spirit or
scope thereof,

Figure 1 is an isometric view of the applicant's wash-off
containment and recirculating apparatus mounted on a conventional
10 concrete mixing truck;

Figure 2 is a side elevational view of the apparatus of Figure
1 and showing the container component in dotted outline in the storage
position;

15

Figure 3 is a top plan view of the apparatus of Figure 1;

20

Figure 4 is a rear elevational view of the apparatus of Figure
1; and

Figure 5 is an enlarged cross-sectional view of the container
component of the applicant's apparatus.

Description

This application relates to a wash-off containment and recirculating apparatus for use in conjunction with a conventional concrete mixer truck 10. As shown in Figure 1, truck 10 includes a large mixing drum 14 for mixing aggregate, sand and cement slurry together. Mix materials are introduced into drum 14 by means of a charging hopper 15. Concrete is discharged from drum 14 into a discharge hopper 16 and down a chute 18 to the desired discharge location, such as into a concrete pump or bucket.

After concrete has been discharged from truck 10 as aforesaid, it is necessary to rinse discharge hopper 16 and chute 18 to remove any sediment or other cementitious debris before truck 10 exits the construction site. This rinsing step is usually performed at a designated wash-off station at the construction site. The purpose of the applicant's invention is to enable the rinsing step to be performed anywhere by containing the rinse water and sediment and automatically recirculating it to mixing drum 14, except for relatively large particle size aggregate which is disposed of separately.

The applicant's apparatus includes a container 20 which is mounted on a frame 21 secured to truck 10 when not in use (Figure 2). As shown best in Figure 5, container 20 includes a closed bottom end 22, sidewalls 24 and an open upper end 31. A pair of hooks 28 are provided at the upper front end of container 20 for removably securing container 20

- 7 -

to the end of truck discharge chute 18 (Figure 2). When secured to chute 18 as shown in Figure 2, container 10 receives substantially all of the rinse water and debris flushed down chute 18. If multiple chute extensions have been used, then container 20 is mounted on the lowermost extension.

- 5 Container 20 is preferably constructed from lightweight aluminum for ease of handling.

A screen 23 having a plurality of openings 25 is removably positionable within container 20 as shown best in Figure 5. Openings 25 are approximately $\frac{1}{4}$ inch (approximately 6.35 mm) in diameter to permit the passage of rinse water and relatively small particle size sediment therethrough. Larger particle size aggregate is trapped by screen 23. Screen 23 has a handle 26 on its upper surface for ease in removing screen 23 and any accumulated aggregate from container 20. As shown in Figure 5, screen 23 is removably supported on a plurality of metal tabs 27 within container 20 at an incline and at an elevation above closed bottom end 22.

Container 20 has an outlet port 29 located in a lower portion thereof below screen 23. A filter 30 is mounted in outlet port 29 to screen 20 any large size aggregate or sediment particles which have passed into the container lower portion (due to misalignment of screen 23, for example).

The applicant's apparatus also includes a truck-mounted pump 32 having a suction hose 34 and a discharge hose 36 (Figures 1 - 4). 25 Preferably pump 32 is an air operated diaphragm pump which is connectable to the pressurized air supply 33 of truck 10 (Figure 2). A

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Wilden™ M4 air operated double diaphragm pump available from Wilden Pump & Engineering Company of Grand Terrace, California is suitable for this purpose.

- 5 Suction hose 34, which is preferably about 1½ inches (approximately 38.1 mm) in diameter, connects pump 32 to container outlet port 29. Conventional male/female cam lock fittings may be used to ensure a secure connection. Discharge hose 36 has one end connected to pump 32 and an open end 38 emptying into charging hopper 15, as best
10 shown in Figures 3 and 4. Discharge hose 36 is preferably secured to the outer surface of truck 10 with a plurality of brackets. Pump 32 is mounted on a rear side portion of truck 10 to minimize the length of discharge hose 36 and hence the effective pumping force required.
- 15 In use, concrete mixer truck operators are required to rinse the truck discharge hopper 16 and chute 18 after use before exiting a construction site. The rinsing operation can conveniently be performed at any location using the applicant's invention by first mounting container 20 at the end of chute 18 using hooks 28. Screen 23 is pre-positioned
20 within container 20 and suction hose 34 is releasably secured to container outlet port 29 as discussed above.

The operator then activates pump 32 and thoroughly rinses discharge hopper 16 and chute 18 to flush any loose sediment or other
25 debris into container 20. The rinse water and relatively small particle size sediment passes through screen 23 into the lower portion of container 20

- 9 -

where it is automatically drawn into suction hose 34 through outlet port 29. The rinse water and sediment is then conveyed by the action of pump 32 into the discharge hose 36 which empties into charging hopper 15 through open end 38 when hopper 15 is the upright position shown in the drawings 5 (Figures 3 and 4). The recirculated rinse water and sediment then flows by gravitational forces down a sloped plate located at the bottom of charging hopper 15 back into mixing drum 14. The upper portion of discharge hose 36 is sufficiently flexible to accomodate pivoting movement of charging hopper 15 when the applicant's invention is not in use.

10

The larger size sediment particles and aggregate are trapped by screen 23. Screen 23 and any accumulated aggregate may be easily removed from container 20 by lifting screen 23 using handle 26. The accumulated aggregate may either be dumped at a suitable location at the 15 construction site or returned to the concrete supply company for disposal.

- 10 -

WHAT IS CLAIMED IS:

1. A wash-off containment and recirculating apparatus for use in association with a concrete truck (10) having a mixing drum (14) and a discharge chute (18), said apparatus comprising a container (20) comprising an open upper end (31), a screen (23) removably positionable within the container (20) and an outlet (29) located in a lower portion of the container (20) below the screen (23), characterized in that said container is removably mountable on the end of said discharge chute (18) and said apparatus further comprises:
 - (a) a pump (32) mountable on said truck (10);
 - (b) a first hose portion connectable to said outlet (29); and
 - (c) a second hose portion in communication with said first hose portion and having an open end emptying into said mixing drum (14);
- 20 wherein operation of said pump (32) automatically conveys any rinse water and sediment capable of passing through said screen (23) from said lower portion of said container (20) to said mixing drum (14) through said first and second hose portions.
- 25 2. The apparatus of claim 1, wherein said screen (23) has a plurality of openings (25) approximately $\frac{1}{4}$ inches (approximately

- 11 -

mm) in diameter for permitting said water and said sediment to pass therethrough but which prevents the passage of aggregate.

3. The apparatus of claim 2, wherein said screen (23) further
5 comprises a handle (26) on its upper surface for lifting said screen (23) and any of said aggregate which has accumulated thereon from said container (20).

4. The apparatus of claim 2, further comprising a filter (30)
10 mounted in said container outlet (29).

5. The apparatus of claim 1, wherein said pump (32) comprises an air-operated diaphragm pump.

- 15 6. The apparatus of claim 5, wherein said pump (32) is connectable to the pressurized air supply (33) of said truck (10).

7. The apparatus of claim 1, wherein said first hose portion comprises a suction hose (34) extending between said pump (32) and said
20 container outlet (29), and said second hose portion comprises a discharge hose (36) extending from said pump (32) to said mixing drum (14).

8. The apparatus of claim 7, wherein said pump (32) is mountable in a rear portion of said truck (10) proximate said mixing drum
25 (14) to minimize the length of said discharge hose (36).

- 12 -

9. The apparatus of claim 1, further comprising a frame (21) mountable on said truck (10) for securely supporting said container (20) when it is not in use.
- 5 10. The apparatus of claim 7, wherein the truck further includes a charging hopper (15) in communication with the mixing drum (14) and wherein said discharge hose (36) is mountable on said truck (10) so as to discharge into the charging hopper (15).
- 10 11. A method of rinsing a vehicle adapted for discharging concrete mix materials, the vehicle having a mixing drum (14), a discharge hopper (16) and a discharge chute (18), characterized in that said method comprises:
- 15 (a) providing a container (20) mountable on said vehicle, said container (20) having a screen (23) removably positionable within said container (20) and an outlet (29) located in a lower portion of said container (20) below said screen (23);
- 20 (b) removably positioning said container (20) at a lower end of said discharge chute (18);
- 25 (c) rinsing said discharge chute (18) and discharge hopper (16) with rinse water to wash sediment and aggregate present therein into said container (20); and

- 13 -

(d) pumping said rinse water and sediment passing through said screen (23) from said outlet (29) of said container (20) into said mixing drum (14).

5 12. The method of claim 11, wherein said container (20) is removably mounted on a lower end of said discharge chute (18) during said rinsing and pumping steps.

ON-SITE CONCRETE TRUCK WASH-OUT APPARATUS

Technical Field

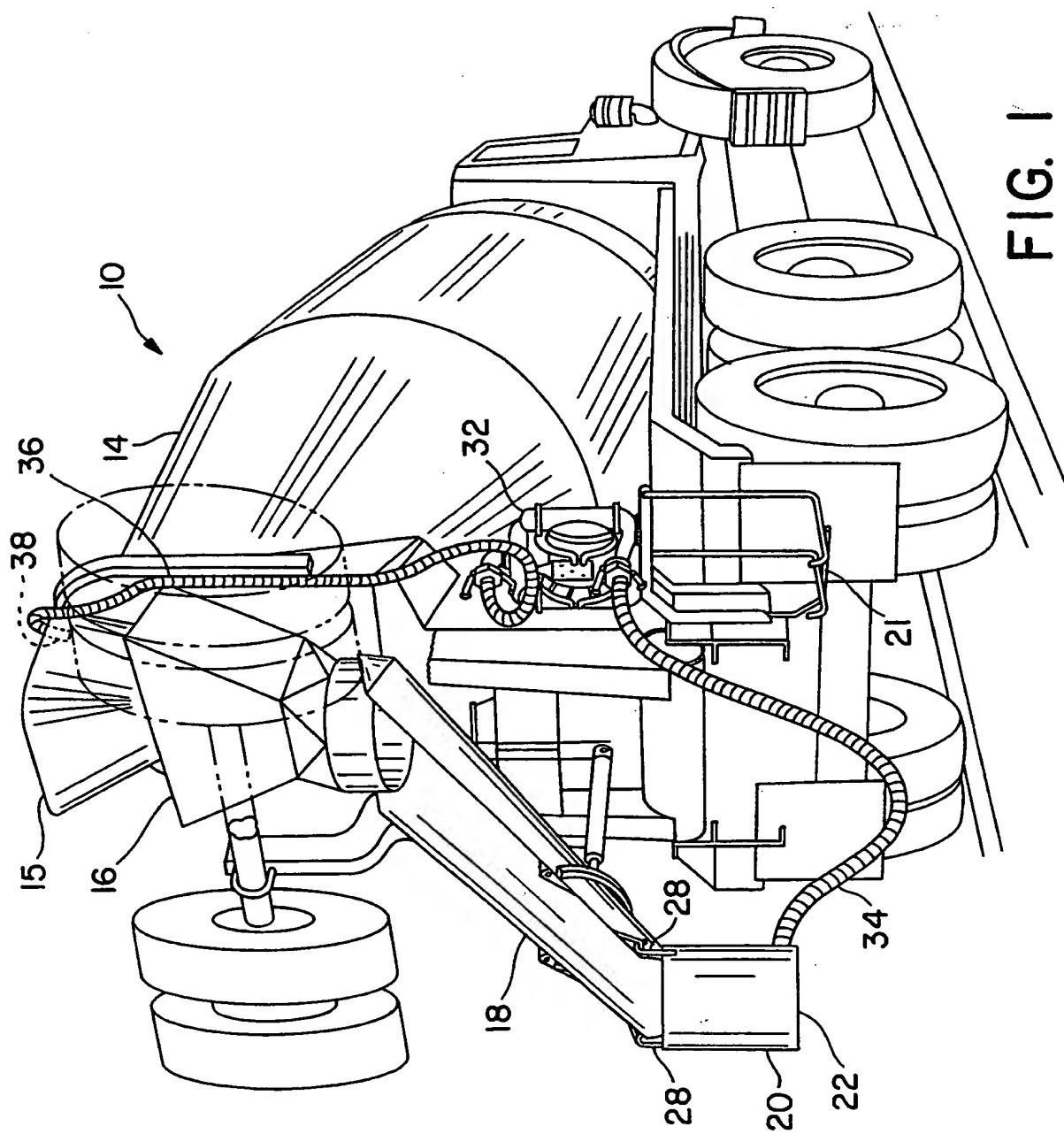
5 This application relates to an apparatus and method for containing and filtering rinse water, sediment and aggregate resulting from washing the hopper and discharge chute components of a concrete truck at a construction site after use. The apparatus includes a truck-mounted pump for automatically recirculating the rinse water and relatively small
10 particle size sediment from a container mountable at the end of the discharge chute to the mixing drum of the concrete truck.

Background

15 Conventional concrete trucks include large drum containers for mixing aggregate, sand and cement slurry together. The concrete is discharged from the drum into a hopper and down a chute to the desired discharge location, such as into a concrete pump or bucket.

20 After concrete has been fully discharged from the truck, the operator must rinse debris adhering to the discharge hopper and outlet chute before leaving the construction site. Accordingly, the contractor must provide a designated location at the construction site where this rinsing operation may occur. This is often inconvenient and inefficient,
25 especially if the rinsing station is located at a site remote from the concrete discharge location.

1 / 5



2 / 5

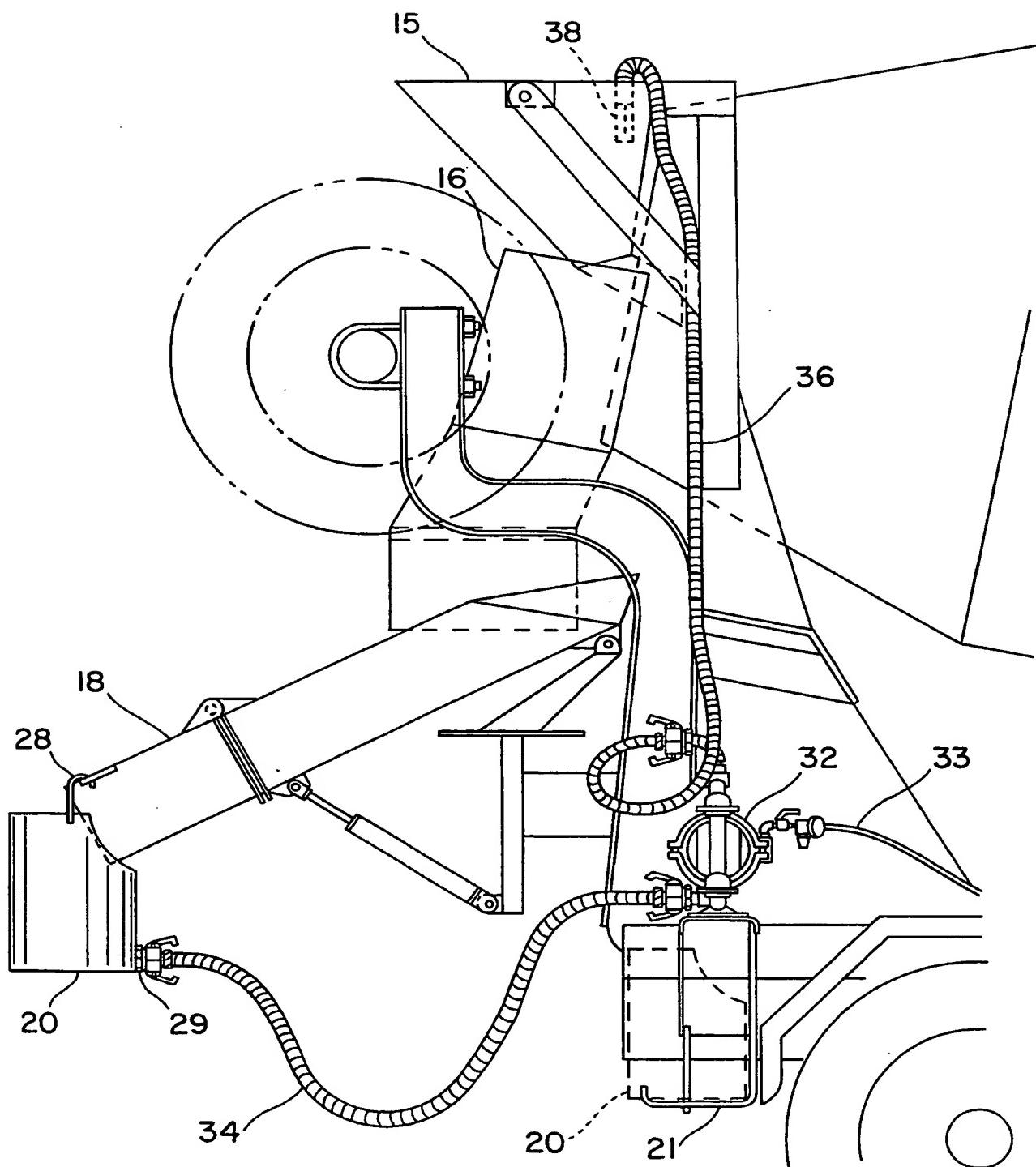


FIG. 2

SUBSTITUTE SHEET (RULE 26)

3 / 5

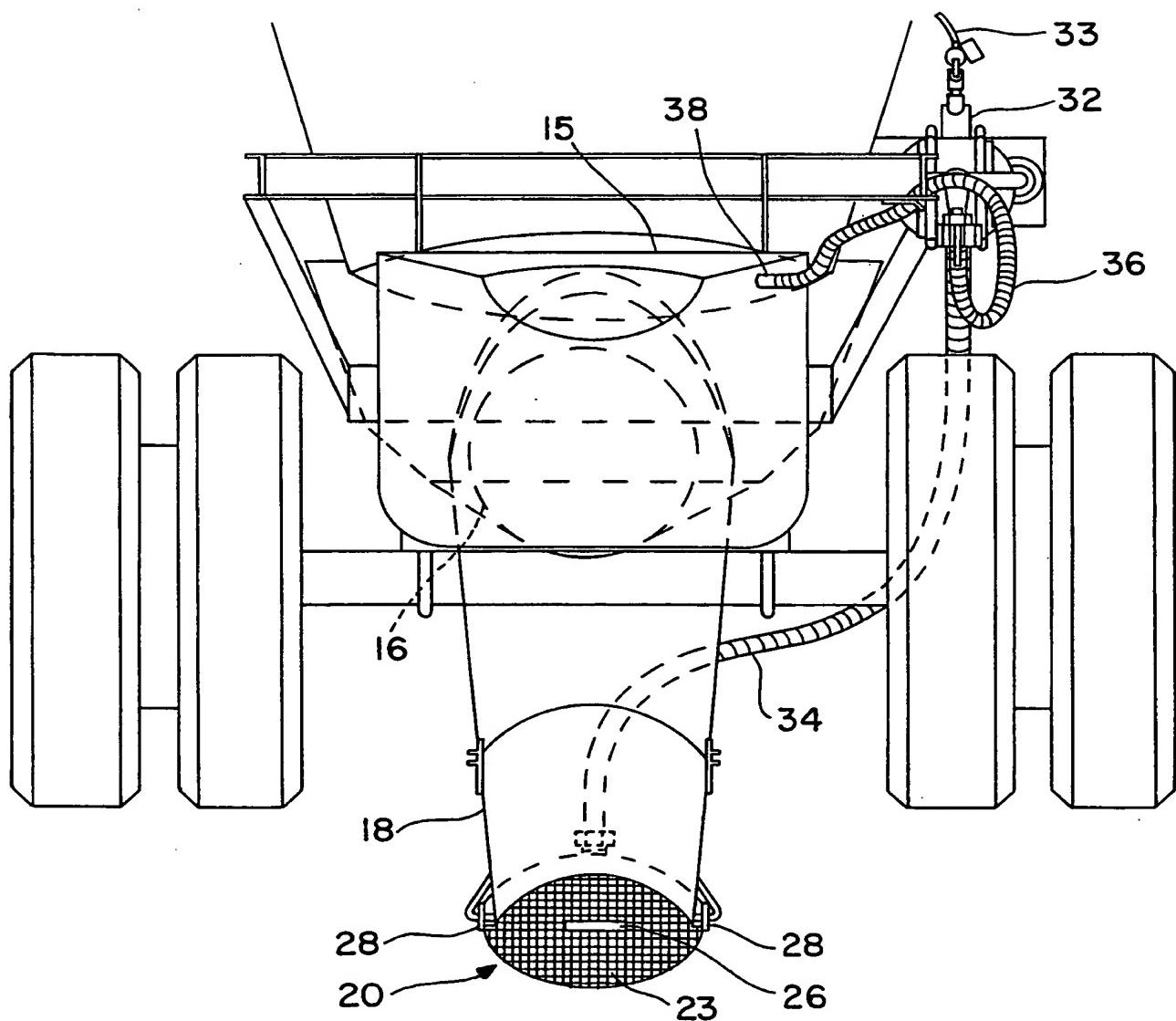


FIG. 3

4 / 5

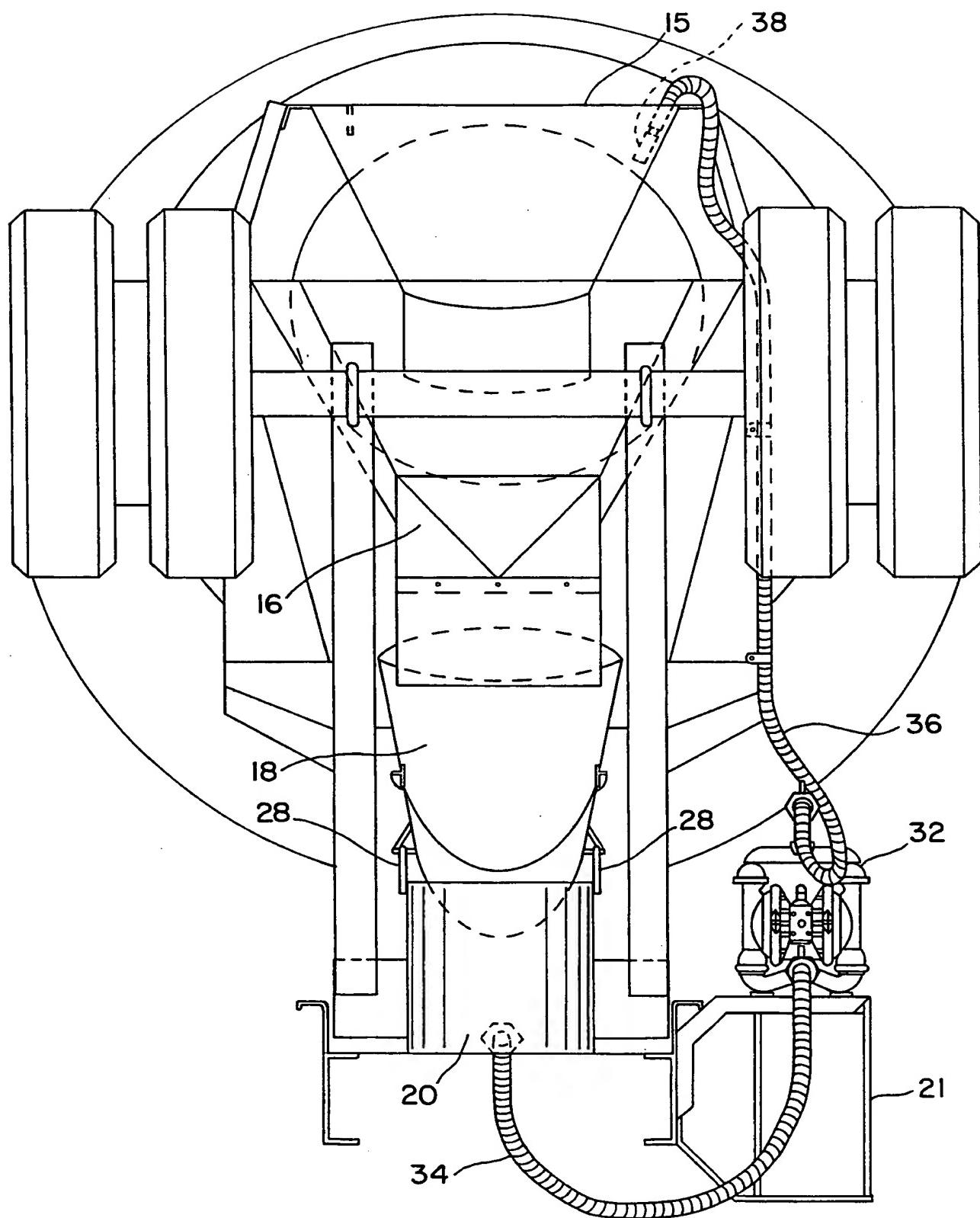


FIG. 4
SUBSTITUTE SHEET (RULE 26)

5 / 5

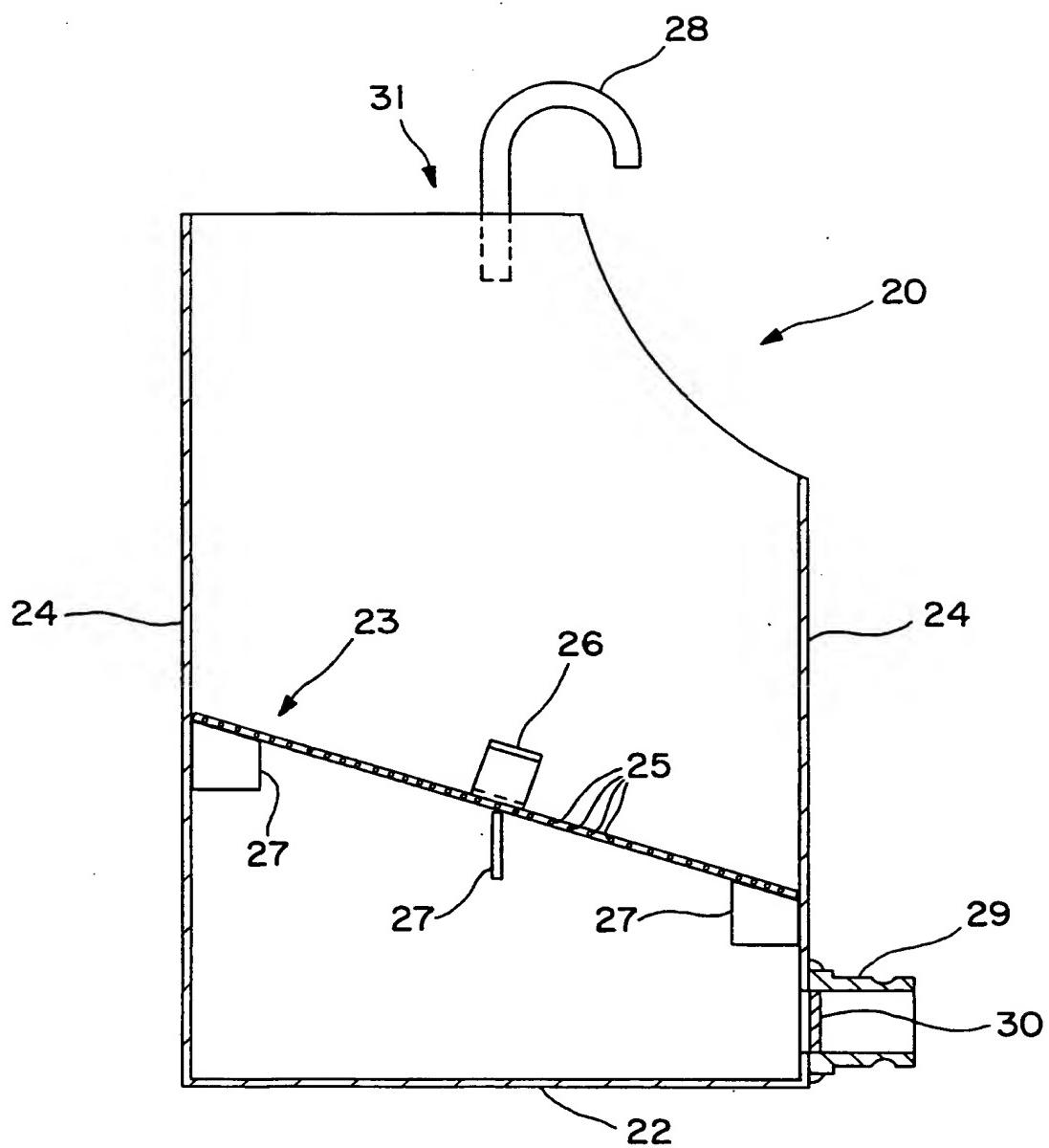


FIG. 5

INTERNATIONAL SEARCH REPORT

Int	Application No
PCT/CA 00/00350	

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B03B9/06 B08B9/00 B28C5/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B03B B08B B28C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 685 978 A (PETRICK ET AL) 11 November 1997 (1997-11-11) column 2, line 28 - line 45 column 4, line 28 - line 36 column 6, line 13 - line 14 column 9, line 42 - line 60; figures 1-3	11
A	-----	1,2,9,10
Y	EP 0 034 539 A (COMPAGNIE DES SABLIERES DE LA SEINE) 26 August 1981 (1981-08-26) page 9, line 8 - line 26; figure 1	11
A	-----	1,9,10
	-/-	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

28 June 2000

Date of mailing of the international search report

07/07/2000

Name and mailing address of the ISA

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Authorized officer

Van der Zee, W

INTERNATIONAL SEARCH REPORT

Int. Application No.
PCT/CA 00/00350

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 013, no. 237 (M-833), 5 June 1989 (1989-06-05) & JP 001 049604 A (MOTOMISE NAMAKON KK), 27 February 1989 (1989-02-27) abstract ---	1,8-11
A	US 5 605 398 A (CRONQUIST) 25 February 1997 (1997-02-25) column 2, line 41 - line 65; figures ---	1,9-11
A	GB 2 147 012 A (SAFETY-KLEEN PARTS WASHER SERVICE LTD) 1 May 1985 (1985-05-01) page 2, line 19 - line 35 page 2, line 62 - line 69; figures ---	1,10,11
A	US 5 741 065 A (BELL ET AL) 21 April 1998 (1998-04-21) abstract column 3, line 51 - line 58 column 4, line 51 - column 5, line 16; figures 1-5 -----	1,9-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. Application No.

PCT/CA 00/00350

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5685978	A	11-11-1997	NONE		
EP 0034539	A	26-08-1981	FR	2475943 A	21-08-1981
			BE	887500 A	12-08-1981
			DE	3105075 A	17-12-1981
JP 001049604	A	27-02-1989	NONE		
US 5605398	A	25-02-1997	NONE		
GB 2147012	A	01-05-1985	AU	565596 B	24-09-1987
			AU	3027084 A	10-01-1985
			CA	1250208 A	21-02-1989
			DE	3425033 A	17-01-1985
			FR	2548607 A	11-01-1985
			JP	60038077 A	27-02-1985
			NZ	208718 A	10-09-1986
US 5741065	A	21-04-1998	CA	2205855 A	23-11-1997

Moreover, concrete truck wash-off can pose serious environmental concerns. In many cases precautions must be taken at the construction site to ensure that sediment and cementitious debris does not contaminate the site or adjoining waterways. Enforcement of environmental regulations at construction sites is becoming increasingly stringent and hence it is anticipated that this issue will become more prominent in the future.

Some concrete supply companies have developed truck-mounted wash-off containment systems in attempt to address this problem. However, existing systems are unreliable and are not user-friendly. According to one existing system developed by Lafarge Canada Inc., a funnel is removably mounted at the end of the truck discharge chute before the hopper and chute are rinsed. The funnel directs rinse water and sediment adhering to the hopper and chute into a 5 gallon bucket which is positioned on the ground. The operator is then required to lift the bucket and carry it to a 15 gallon pressurized tank which is mounted on a truck frame immediately behind the truck cab. The contents of the bucket are then carefully dumped into the tank inlet through a metal screen which filters out larger size aggregate granules. After the tank is pressurized, a discharge valve is opened and the sediment and rinse water is blown through a discharge hose into the truck mixing drum.

The Lafarge system suffers from several shortcomings. The need to manually lift the 5 gallon containment bucket from ground level, carry the bucket to the pressurized tank, and carefully discharge the bucket

- 4 -

between the container outlet and the pump; and a discharge hose extending from the pump to an open end discharging into the mixing drum. When the pump is operating, rinse water and relatively small particle size sediment flowing down the chute and into the container is automatically 5 conveyed through the suction and discharge hoses into the mixing drum. Preferably, the screen has openings approximately $\frac{1}{4}$ inches in diameter to trap relatively large particle size aggregate, thereby preventing clogging of the pump fittings.

10 The screen may further include a handle on its upper surface for lifting the screen and any of the relatively large particle size aggregate which has accumulated thereon from the container. Optionally, a filter may be mounted in the container outlet as an additional safeguard.

15 Preferably the pump comprises an air-operated diaphragm pump connectable to the pressurized air supply of the truck. In order to minimize the length of the discharge hose, the pump is preferably mounted in a rear portion of the truck proximate the mixing drum. A frame may also be provided on the truck for securely storing the container when it is 20 not in use.

- 7 -

- to the end of truck discharge chute 18 (Figure 2). When secured to chute 18 as shown in Figure 2, container 10 receives substantially all of the rinse water and debris flushed down chute 18. If multiple chute extensions have been used, then container 20 is mounted on the lowermost extension.
- 5 Container 20 is preferably constructed from lightweight aluminum for ease of handling.

A screen 23 having a plurality of openings 25 is removably positionable within container 20 as shown best in Figure 5. Openings 25 are approximately $\frac{1}{4}$ inch in diameter to permit the passage of rinse water and relatively small particle size sediment therethrough. Larger particle size aggregate is trapped by screen 23. Screen 23 has a handle 26 on its upper surface for ease in removing screen 23 and any accumulated aggregate from container 20. As shown in Figure 5, screen 23 is 15 removably supported on a plurality of metal tabs 27 within container 20 at an incline and at an elevation above closed bottom end 22.

Container 20 has an outlet port 29 located in a lower portion thereof below screen 23. A filter 30 is mounted in outlet port 29 to screen 20 any large size aggregate or sediment particles which have passed into the container lower portion (due to misalignment of screen 23, for example).

The applicant's apparatus also includes a truck-mounted pump 32 having a suction hose 34 and a discharge hose 36 (Figures 1 - 4). 25 Preferably pump 32 is an air operated diaphragm pump which is connectable to the pressurized air supply 33 of truck 10 (Figure 2). A

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Wilden™ M4 air operated double diaphragm pump available from Wilden Pump & Engineering Company of Grand Terrace, California is suitable for this purpose.

- 5 Suction hose 34, which is preferably about 1½ inches in diameter, connects pump 32 to container outlet port 29. Conventional male/female cam lock fittings may be used to ensure a secure connection. Discharge hose 36 has one end connected to pump 32 and an open end 38 emptying into charging hopper 15, as best shown in Figures 3 and 4.
- 10 Discharge hose 36 is preferably secured to the outer surface of truck 10 with a plurality of brackets. Pump 32 is mounted on a rear side portion of truck 10 to minimize the length of discharge hose 36 and hence the effective pumping force required.
- 15 In use, concrete mixer truck operators are required to rinse the truck discharge hopper 16 and chute 18 after use before exiting a construction site. The rinsing operation can conveniently be performed at any location using the applicant's invention by first mounting container 20 at the end of chute 18 using hooks 28. Screen 23 is pre-positioned 20 within container 20 and suction hose 34 is releasably secured to container outlet port 29 as discussed above.

The operator then activates pump 32 and thoroughly rinses discharge hopper 16 and chute 18 to flush any loose sediment or other debris into container 20. The rinse water and relatively small particle size sediment passes through screen 23 into the lower portion of container 20

where it is automatically drawn into suction hose 34 through outlet port 29. The rinse water and sediment is then conveyed by the action of pump 32 into the discharge hose 36 which empties into charging hopper 15 through open end 38 when hopper 15 is the upright position shown in the drawings 5 (Figures 3 and 4). The recirculated rinse water and sediment then flows by gravitational forces down a sloped plate located at the bottom of charging hopper 15 back into mixing drum 14. The upper portion of discharge hose 36 is sufficiently flexible to accomodate pivoting movement of charging hopper 15 when the applicant's invention is not in use.

10

The larger size sediment particles and aggregate are trapped by screen 23. Screen 23 and any accumulated aggregate may be easily removed from container 20 by lifting screen 23 using handle 26. The accumulated aggregate may either be dumped at a suitable location at the 15 construction site or returned to the concrete supply company for disposal.

As will be apparent to those skilled in the art in the light of the foregoing disclosure, many alterations and modifications are possible in the practice of this invention without departing from the spirit or scope 20 thereof. For example, any suitable pump could be substituted for air operated diaphragm pump 32. Accordingly, the scope of the invention is to be construed in accordance with the substance defined by the following claims.

- 10 -

WHAT IS CLAIMED IS:

1. A wash-off containment and recirculating apparatus for use in association with a concrete truck having a mixing drum and a discharge chute, said apparatus comprising:

(a) a container removably mountable on the end of said discharge chute, said container comprising an open upper end, a screen removably positionable within said container and an outlet located in a lower portion of said container below said screen; and

(b) a pump mountable on said truck, said pump comprising a suction hose extending between said pump and said container outlet and a discharge hose extending from said pump to an open end discharging into said mixing drum,

wherein operation of said pump automatically recirculates rinse water and relatively small particle size sediment flowing into said lower portion of said container through said suction and discharge hoses into said mixing drum.

2. The apparatus of claim 1, wherein said screen has a plurality of openings approximately $\frac{1}{4}$ inches in diameter for permitting said water and said relatively small particle size sediment to pass therethrough but which prevents the passage of relatively large particle size aggregate.

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3. The apparatus of claim 2, wherein said screen further comprises a handle on its upper surface for lifting said screen and any of said large particle size aggregate which has accumulated thereon from said container.

5

4. The apparatus of claim 2, further comprising a filter mounted in said container outlet.

5. The apparatus of claim 1, wherein said pump comprises an
10 air-operated diaphragm pump.

6. The apparatus of claim 5, wherein said pump is connectable to the pressurized air supply of said truck.

15 7. The apparatus of claim 6, wherein said pump is mounted in a rear portion of said truck proximate said mixing drum to minimize the length of said discharge hose.

8. The apparatus of claim 1, further comprising a frame mounted
20 on said truck for securely supporting said container when it is not in use.

9. The apparatus of claim 1, wherein said truck further comprises a charging hopper in communication with said mixing drum and wherein said discharge hose discharges into said charging hopper.

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10. A wash-off containment and recycling apparatus for use in association with a concrete truck having a mixing drum and a discharge chute, said apparatus comprising:

5 (a) a container removably mountable on the end of said discharge chute, said container comprising an open upper end, a screen removably positionable within said container and an outlet located in a lower portion of said container below said screen;

10 (b) a hose connectable to said outlet and having an open end emptying into said mixing drum; and

15 (c) a pump for automatically pumping any rinse water and relatively small particle size sediment capable of passing through said screen from said lower portion of said container to said mixing drum through said hose.

11. A method of rinsing a vehicle for adapted for discharging concrete or the like, said vehicle having a mixing drum, a hopper and a discharge chute, characterized in that said method comprises:

20 (a) positioning a removable container at a lower end of said discharge chute, said container having a screen removably positionable within said container and an outlet located in a lower portion of said container below said screen;

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- (b) rinsing said discharge chute and hopper with rinse water to wash sediment and aggregate present therein into said container; and
- 5 (c) pumping said rinse water and relatively small particle size sediment passing through said screen from said outlet of said container into said mixing drum.

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference O094-0003	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/CA00/00350	International filing date (day/month/year) 30/03/2000	Priority date (day/month/year) 30/03/1999
International Patent Classification (IPC) or national classification and IPC B03B9/06		
<p>Applicant OCEAN CONSTRUCTION SUPPLIES LIMITED et al.</p> <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 10 sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 		

Date of submission of the demand 27/10/2000	Date of completion of this report 29.06.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Koob, M Telephone No. +49 89 2399 2080



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/CA00/00350

I. Basis of the report

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):
Description, pages:

1,3,5,6	as originally filed	
2,2a,4,7-9	with telefax of	09/03/2001

Claims, No.:

1-12	with telefax of	09/03/2001
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Drawings, sheets:

1/5-5/5	as received on	13/06/2000	with letter of	15/05/2000
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/CA00/00350

the description, pages:

the claims, Nos.:

the drawings, sheets:

5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 1-12
 No: Claims

Inventive step (IS) Yes: Claims 1-12
 No: Claims

Industrial applicability (IA) Yes: Claims 1-12
 No: Claims

**2. Citations and explanations
see separate sheet**

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/CA00/00350

V. Reasoned statement

1. The subject-matter of **claim 1** meets the requirements of Article 33 PCT in respect of novelty and inventive step.
 - 1.1 The document **US-A-5 685 978** discloses a wash-off containment and recirculating apparatus comprising:
 - a container (38) comprising
 - an open upper end (40)
 - a screen (54)
 - an outlet (70)
 - 1.2 The subject-matter of **claim 1** differs from **US-A-5 685 978** in
 - the container being removably mounted on the end of a discharge chute
 - a pump mountable on a truck
 - a first and second hose portion
 - 1.3 The technical problem to be solved is to provide a wash-off containment and recirculating apparatus for rinsing a vehicle such as a concrete truck after use wherever the vehicle may be located without contaminating the surrounding site.
 - 1.4 Non of the documents cited in the international search report disclose in combination the differentiating features of the claim. Therefore the man skilled in the art is not lead to the subject-matter of **claim 1**.
2. **Claims 2-10** are preferred embodiments of **claim 1** and meet as such the requirements of the PCT with respect to novelty and inventive step.
3. The subject-matter of **claim 11** complies with the provisions of Article 33 PCT in respect of novelty and inventive step.
 - 3.1 The document **US-A-5 685 978** discloses the following method of rinsing a vehicle:
 - providing a container
 - said container having a screen (54) removably positionable within the

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/CA00/00350

container

- said container having an outlet (68) located in a lower portion of said container below said screen

- removably positioning the container at a lower end of a discharge chute (column 9, lines 45-47)

- rinsing said discharge chute and discharge hopper with rinse water to wash sediment and aggregate present therein into said container (column 9, lines 48-51)

3.2 The subject-matter of **claim 11** differs from **US-A-5 685 978** in the method step of:

- providing a container being mountable on said vehicle

- pumping said rinse water and sediment passing through said screen from said outlet of said container into a mixing drum

3.3 The technical problem to be solved is to rinse a vehicle such as a concrete truck after use wherever the vehicle may be located without contaminating the surrounding site.

3.4 The document **FR-A-0 034 539** discloses a method of rinsing a vehicle using non-removable equipment. The rinse water is reused for rinsing (page 9, lines 23-25) the mixing drum (figure 1). As disclosed in figure 1 the rinse water is pumped (figure 1; pump (without reference sign) in duct between "eau claire" and mixing drum) back for recycling. As the document discloses a permanent installation it does not teach the use of a container being mountable on a vehicle.

The document **US-A-5 741 065** discloses a method of rinsing a vehicle with the use of a container being mountable on the vehicle. The whole content of the container is poured into the mixing drum using a lifting mechanism. Therefore this document does not teach the use of a pump. Furthermore not only the sediment passing through a screen is conveyed in the drum but the whole sediment.

4. **Claim 12** is a preferred embodiment of **claim 11** and meets as such the requirements of the PCT with respect to novelty and inventive step.

- 2 -

Moreover, concrete truck wash-off can pose serious environmental concerns. In many cases precautions must be taken at the construction site to ensure that sediment and cementitious debris does not contaminate the site or adjoining waterways. Enforcement of environmental regulations at construction sites is becoming increasingly stringent and hence it is anticipated that this issue will become more prominent in the future.

United States Patent No. 5,685,978, Petrick et al., dated 11 November, 1997 exemplifies the prior art. Petrick et al. discloses a concrete reclaimer which is positioned at a designated location at a construction site. In use, once a concrete truck finishes placing a load of concrete, it backs up to the location of the reclaimer to a position where the end of its delivery chute is disposed above the reclaimer. The chute and other delivery equipment is then washed with a stream of water ordinarily supplied from the truck. The reclaimer includes a separating screen for separating aggregate from sand and uncured cement. After the washing operations, the reclaimer may be transported to a recycling facility where the aggregate, sand, cement and water is removed and reused in the manufacture of fresh concrete. The Petrick et al. reclaimer is portable but only with the use of heavy equipment, such as a fork lift. For example, in order to transport the reclaimer to the recycling facility, the reclaimer must be lifted on to a flatbed truck or the like.

Some concrete supply companies have developed truck-mounted wash-off containment systems. However, existing systems are

- 2a -

unreliable and are not user-friendly. According to one existing system developed by Lafarge Canada Inc., a funnel is removably mounted at the end of the truck discharge chute before the hopper and chute are rinsed. The funnel directs rinse water and sediment adhering to the hopper and

5 chute into a 5 gallon (approximately 20 litre) bucket which is positioned on the ground. The operator is then required to lift the bucket and carry it to a 15 gallon (approximately 60 litre) pressurized tank which is mounted on a truck frame immediately behind the truck cab. The contents of the bucket are then carefully dumped into the tank inlet through a metal screen

10 which filters out larger size aggregate granules. After the tank is pressurized, a discharge valve is opened and the sediment and rinse water is blown through a discharge hose into the truck mixing drum.

The Lafarge system suffers from several shortcomings. The

15 need to manually lift the 5 gallon (approximately 20 litre) containment bucket from ground level, carry the bucket to the pressurized tank, and carefully discharge the bucket

- 4 -

between the container outlet and the pump; and a discharge hose extending from the pump to an open end discharging into the mixing drum. When the pump is operating, rinse water and relatively small particle size sediment flowing down the chute and into the container is automatically 5 conveyed through the suction and discharge hoses into the mixing drum. Preferably, the screen has openings approximately $\frac{1}{4}$ inches (approximately 6.35 mm) in diameter to trap relatively large particle size aggregate, thereby preventing clogging of the pump fittings.

10 The screen may further include a handle on its upper surface for lifting the screen and any of the relatively large particle size aggregate which has accumulated thereon from the container. Optionally, a filter may be mounted in the container outlet as an additional safeguard.

15 Preferably the pump comprises an air-operated diaphragm pump connectable to the pressurized air supply of the truck. In order to minimize the length of the discharge hose, the pump is preferably mounted in a rear portion of the truck proximate the mixing drum. A frame may also be provided on the truck for securely storing the container when it is 20 not in use.

- 7 -

to the end of truck discharge chute 18 (Figure 2). When secured to chute 18 as shown in Figure 2, container 10 receives substantially all of the rinse water and debris flushed down chute 18. If multiple chute extensions have been used, then container 20 is mounted on the lowermost extension.

- 5 Container 20 is preferably constructed from lightweight aluminum for ease of handling.

A screen 23 having a plurality of openings 25 is removably positionable within container 20 as shown best in Figure 5. Openings 25 are approximately $\frac{1}{4}$ inch (approximately 6.35 mm) in diameter to permit the passage of rinse water and relatively small particle size sediment therethrough. Larger particle size aggregate is trapped by screen 23. Screen 23 has a handle 26 on its upper surface for ease in removing screen 23 and any accumulated aggregate from container 20. As shown in Figure 15, screen 23 is removably supported on a plurality of metal tabs 27 within container 20 at an incline and at an elevation above closed bottom end 22.

Container 20 has an outlet port 29 located in a lower portion thereof below screen 23. A filter 30 is mounted in outlet port 29 to screen 20 any large size aggregate or sediment particles which have passed into the container lower portion (due to misalignment of screen 23, for example).

The applicant's apparatus also includes a truck-mounted pump 32 having a suction hose 34 and a discharge hose 36 (Figures 1 - 4). 25 Preferably pump 32 is an air operated diaphragm pump which is connectable to the pressurized air supply 33 of truck 10 (Figure 2). A

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Wilden™ M4 air operated double diaphragm pump available from Wilden Pump & Engineering Company of Grand Terrace, California is suitable for this purpose.

5 Suction hose 34, which is preferably about 1½ inches (approximately 38.1 mm) in diameter, connects pump 32 to container outlet port 29. Conventional male/female cam lock fittings may be used to ensure a secure connection. Discharge hose 36 has one end connected to pump 32 and an open end 38 emptying into charging hopper 15, as best
10 shown in Figures 3 and 4. Discharge hose 36 is preferably secured to the outer surface of truck 10 with a plurality of brackets. Pump 32 is mounted on a rear side portion of truck 10 to minimize the length of discharge hose 36 and hence the effective pumping force required.

15 In use, concrete mixer truck operators are required to rinse the truck discharge hopper 16 and chute 18 after use before exiting a construction site. The rinsing operation can conveniently be performed at any location using the applicant's invention by first mounting container 20 at the end of chute 18 using hooks 28. Screen 23 is pre-positioned
20 within container 20 and suction hose 34 is releasably secured to container outlet port 29 as discussed above.

The operator then activates pump 32 and thoroughly rinses discharge hopper 16 and chute 18 to flush any loose sediment or other debris into container 20. The rinse water and relatively small particle size sediment passes through screen 23 into the lower portion of container 20

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where it is automatically drawn into suction hose 34 through outlet port 29. The rinse water and sediment is then conveyed by the action of pump 32 into the discharge hose 36 which empties into charging hopper 15 through open end 38 when hopper 15 is the upright position shown in the drawings 5 (Figures 3 and 4). The recirculated rinse water and sediment then flows by gravitational forces down a sloped plate located at the bottom of charging hopper 15 back into mixing drum 14. The upper portion of discharge hose 36 is sufficiently flexible to accomodate pivoting movement of charging hopper 15 when the applicant's invention is not in use.

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The larger size sediment particles and aggregate are trapped by screen 23. Screen 23 and any accumulated aggregate may be easily removed from container 20 by lifting screen 23 using handle 26. The accumulated aggregate may either be dumped at a suitable location at the 15 construction site or returned to the concrete supply company for disposal.

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WHAT IS CLAIMED IS:

1. A wash-off containment and recirculating apparatus for use in association with a concrete truck (10) having a mixing drum (14) and a discharge chute (18), said apparatus comprising a container (20) comprising an open upper end (31), a screen (23) removably positionable within the container (20) and an outlet (29) located in a lower portion of the container (20) below the screen (23), characterized in that said container is removably mountable on the end of said discharge chute (18) and said apparatus further comprises:
 - (a) a pump (32) mountable on said truck (10);
 - (b) a first hose portion connectable to said outlet (29); and
 - (c) a second hose portion in communication with said first hose portion and having an open end emptying into said mixing drum (14);
- 20 wherein operation of said pump (32) automatically conveys any rinse water and sediment capable of passing through said screen (23) from said lower portion of said container (20) to said mixing drum (14) through said first and second hose portions.
- 25 2. The apparatus of claim 1, wherein said screen (23) has a plurality of openings (25) approximately $\frac{1}{4}$ inches (approximately

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mm) in diameter for permitting said water and said sediment to pass therethrough but which prevents the passage of aggregate.

3. The apparatus of claim 2, wherein said screen (23) further
5 comprises a handle (26) on its upper surface for lifting said screen (23) and any of said aggregate which has accumulated thereon from said container (20).

4. The apparatus of claim 2, further comprising a filter (30)
10 mounted in said container outlet (29).

5. The apparatus of claim 1, wherein said pump (32) comprises an air-operated diaphragm pump.

- 15 6. The apparatus of claim 5, wherein said pump (32) is connectable to the pressurized air supply (33) of said truck (10).

7. The apparatus of claim 1, wherein said first hose portion comprises a suction hose (34) extending between said pump (32) and said
20 container outlet (29), and said second hose portion comprises a discharge hose (36) extending from said pump (32) to said mixing drum (14).

8. The apparatus of claim 7, wherein said pump (32) is mountable in a rear portion of said truck (10) proximate said mixing drum
25 (14) to minimize the length of said discharge hose (36).

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9. The apparatus of claim 1, further comprising a frame (21) mountable on said truck (10) for securely supporting said container (20) when it is not in use.

5 10. The apparatus of claim 7, wherein the truck further includes a charging hopper (15) in communication with the mixing drum (14) and wherein said discharge hose (36) is mountable on said truck (10) so as to discharge into the charging hopper (15).

10 11. A method of rinsing a vehicle adapted for discharging concrete mix materials, the vehicle having a mixing drum (14), a discharge hopper (16) and a discharge chute (18), characterized in that said method comprises:

15 (a) providing a container (20) mountable on said vehicle, said container (20) having a screen (23) removably positionable within said container (20) and an outlet (29) located in a lower portion of said container (20) below said screen (23);

20 (b) removably positioning said container (20) at a lower end of said discharge chute (18);

25 (c) rinsing said discharge chute (18) and discharge hopper (16) with rinse water to wash sediment and aggregate present therein into said container (20); and

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(d) pumping said rinse water and sediment passing through said screen (23) from said outlet (29) of said container (20) into said mixing drum (14).

5 12. The method of claim 11, wherein said container (20) is removably mounted on a lower end of said discharge chute (18) during said rinsing and pumping steps.